Dougal gives a brief account of Meyer's recent volume, 'Wesen und Lebensgeschichte der Stärkekörner der höherer Pflanzen;' and Mr. Theo. Holm abstracts Bonnier's paper, 'Les plantes arctiques comparées aux mêmes espèces des Alpes et des Pyrénées.'

In *Briefer Articles* Thomas Meehan discusses the derivation of Linnæan specific names; Bessie L. Putnam describes three instances of day blooming in *Cereus grandiflorus* on account of retardation by cold weather; J. B. S. Norton reports for the first time the occurrence on Indian corn of *Ustilago Reiliana*, which was discovered in this country a few years ago on sorghum; and A. S. Hitchcock describes the cultivation of *Buchloe dactyloides* (buffalo grass) to determine the question of the arrangement of its inflorescence. The *Editorial* deals with the decline in interest in the A. A. A. S. shown in the Springfield meeting and the best methods of increasing the interest again. In *Current Literature* there is a review of the second edition of Mrs. Dana's 'How to Know the Wild Flowers.' In *Open Letters* Prof. Kellerman continues the discussion on nomenclature. *Notes and News.*

BOTANICAL GAZETTE, NOVEMBER.*

Recording Apparatus for the Study of Transpiration of Plants: Albert F. Woods. Mr. Woods has adapted Marvin's recording rain gauge, with the assistance of Prof. Marvin, to recording continuously the weight of a plant which is losing water by evaporation. In this paper he describes and figures the apparatus and its records.

New or Peculiar Aquatic Fungi, II.: Roland Thaxter. In this second paper Dr. Thaxter deals with the genera *Gonapodya* and *Myriobleph-aris*. To the former he refers *Saprolegnia siliquæformis* of Reinsch, and a new species which he calls *G. polymorpha*. *Myrioblepharis* is a new genus with a single species, *M. paradoxa*. Not only descriptions but life histories of these plants are given, accompanied by a handsome plate.

Observations on the Development of Uncinula spiralis: B. T. Galloway. Knowledge of how this fungus passes the winter and infects its host, the grape, in the spring has been wanting heretofore, and the investigations of Mr. Galloway were directed to these points. The development in the course of the winter and the mode of germination of the ascospores he succeeded in ascertaining, but was unable to infect grape leaves artificially. Two plates illustrate the paper.

Notes from my Herbarium, IV.: Walter Deane. In this installment Mr. Deane describes his 'baby flower press' and the manner in which he secures ephemeral and delicate flowers in good condition for the herbarium, and shows its usefulness for preserving partially dissected parts.

Noteworthy Anatomical and Physiological Researches. Theo. Holm contributes a notice of Andreae's 'Ueber abnorme Wurzelanschwellungen bei *Ailanthus glandulosus*,' and of several papers upon galls. Professor MacDougal writes an account of Czapek's 'Ueber Zusammenwirkung von Heliotropismus und Geotropismus.'

In *Briefer Articles* L. H. Dewey shows, with the aid of a map, the distribution of the Russian Thistle in the United States, up to October 30, 1895. Margaret F. Boynton describes some observations on the distances to which seeds are thrown or wafted by the wind; and T. D. A. Cockerell writes of Western weeds and some alien weeds in the West. In *Current Literature* there are reviews of the 'Kew Index,' just completed, the new fascicle of Gray's 'Synoptical Flora of North America,' the eleventh volume of Saccardo's 'Sylloge Fungorum,' the fourth volume of Massee's 'British Fungus-flora,' together with notices of several other smaller works. In *Open Letters* the nomenclature discussion continues, with a contribution on homonyms by J. H. Barnhart, and F. A. Bather takes Mr. Millspaugh to task for some classical heresies anent decapitalization.

*Issued November 17, 1895. 40 pp. 4 pl.

ACADEMIES AND SOCIETIES.

NATIONAL GEOGRAPHIC SOCIETY, FOURTH MEETING OF THE FRIDAY EVENING COURSE, WASHINGTON, FRIDAY, NOV. 22, 1895.

Mr. E. L. Corthell, the well known civil engineer of New York, delivered an illustrated lecture on the Tehuantepec route and its suitability for an inter-oceanic canal.

Mr. Corthell spoke of the efforts which have been made for centuries to find a passageway between North and South America, leading into the Pacific Ocean. Cortez was struck with the small obstacle to crossing the isthmus which he found at Tehuantepec, and obtained a grant of land where he thought the route of commerce would eventually lie. These are the very lands upon which the Tehuantepec Railroad has been built, and they are still held by Cortez's descendants.

The climatic and nautical conditions of Tehuantepec are favorable, and the country is healthful and approachable for sailing as well as steam vessels. The terminus on the Atlantic side is very near to the United States, while on the west it is naturally protected by rocky headlands. One of the most important geographical facts connected with this question is shown by drawing the shortest great circle between Panama and Yokohama. This line passes east of San Francisco, showing that all commerce by way of Panama, not only for San Francisco, but for China and Japan, must pass directly by the terminus of the Tehuantepec Railroad. A comparison will show that the Tehuantepec route has an advantage over all others of an aggregate of over 125,000 miles.

'ALASKA and Her Boundary' was the subject of an address delivered before the National Geographic Society in the Cosmas Club hall, at Washington, on the evening of November 29th, by Mr. Marcus Baker, of Washington.

By means of Canadian, American and English maps the situation of that part of Alaska's boundary line which is now receiving so much attention in the newspapers, in interviews, in Congress and by three governments was made clear. The eastern boundary of Alaska was first laid down by the convention between Great Britain and Russia in 1825. The speaker traced the history of the region in question from its first discovery by Bering in 1725 down to the convention of 1825, pointing out the three great steps of geographic progress during that century. First, the map published by the St. Petersburg Academy as the result of Bering's second expedition; second, the map resulting from Cook's explorations of 1778, and lastly, the maps resulting from Vancouver's work in 1792–4. Mr. Baker discussed the history of these maps and pointed out their merits and demerits, dwelling on the map of Vancouver, which, he said, was remarkable for accuracy and trustworthiness.

When the Russian and English diplomatists, said Mr. Baker, agreed upon and described what is now Alaska's eastern boundary line, all the interior of Alaska was a blank on the maps. Whether Alaska and Greenland were united or separated, no man knew, and the boundary line passed almost absolutely through territory unvisited by white men. The southeastern part of Alaska may conveniently be called the Pan Handle. On Vancouver's map, which was used by the diplomatists, a well-defined range of mountains is shown, stretching in a general way parallel to the continental shore. The diplomatists took this range of mountains for the boundary, but provided that in case this supposed range should extend more than 35 miles inland, then the boundary should be a line parallel to the winding of the coast and 10 marine leagues, equivalent to 35 miles, therefrom.

The Alaskan boundary question resolves itself therefore into this: The supposed mountain range does not exist. It is therefore needful to fall back upon the alternative line, that is, a line parallel to the winding of the coast, and, further, it is necessary to determine what, within the meaning of the treaty, constitutes a coast line. Is the line to follow the high-water mark of salt water, or is it to be carried from headland across narrow inlets? This is one of the questions to be adjudicated.

As to the extreme southern part of the Pan Handle, Gen. R. D. Cameron, of British Columbia, some years ago in an official document gave a novel and startling interpretation of the treaty. It was clearly provided in the treaty that the boundary line should start from the southernmost part of Prince of Wales Island, and proceed northward up Portland Canal. General Cameron, finding that it was necessary to go some distance east along the parallel of 54° 40′ to reach the mouth of Portland Canal, said the words 'Portland Canal' are palpably erroneous. Let us therefore omit them and

carry it northward up Behm Canal. The effect of this change is the transfer from American to British territory of an area about equal to that of the State of Connecticut, an area within which stands a custom house of the United States, within which formally was a military post of the United States, and within which is a large island which by act of Congress four years ago was set apart as a reservation for a tribe of Indians that left British Columbian territory for the purpose of acquiring a residence on American territory. As to submitting to arbitration the question of domination over this particular part of southeastern Alaska, the speaker declared it would be unwise, unpatriotic, and unjust to our Indian wards. He declared that the only arbitration in such a case was the arbitration of battle.

Mr. Baker's paper will doubtless be published in the National Geographic Magazine.

The meeting closed with brief remarks by Dr. W. H. Dall, of the Geological Survey, who was one of the commissioners on the part of the United States to discuss the boundary question and kindred questions with Canada, in 1887 and 1888, and by General A. W. Greely, United States Army."

W. F. Morsell.

Scientific Association of the Johns Hopkins University.

One hundred and twenty-second regular meeting, November 17, 1895. President Remsen in the chair.

After a few remarks by the President the following papers were presented and read:

1. *The Discovery and the Properties of Helium.* By J. S. Ames and W. W. Randall.

Dr. Randall told the story of the discovery of Helium and discussed its properties from the chemist's point of view. He was followed by Dr. Ames, who confined himself to the properties of the spectrum of the gas. At the end of the meeting an opportunity was afforded those present to view the Helium spectra; the gas being in tubes brought from London by Dr. Randall.

2. *The Solution and Diffusion of Metals in Mercury.* By W. J. Humphreys.

Mr. Humphreys gave the results of a number of experiments on the rate and amount of solution and diffusion of various metals in mercury. Diagrams were exhibited showing the results of the investigation.

The following papers of research were then presented and read by title:

1. *Geometrical Multiplication of Surfaces:* By A. S. Chessin. (Annals of Mathematics.)
2. *On Cauchy's Numbers:* By A. S. Chessin. (Annals of Mathematics.)
3. *On Divergent Series:* By A. S. Chessin. (Bull. Am. Math. Soc.)
4. *On a point of the Theory of Functions:* By A. S. Chessin. (Am. Journal of Math.)
5. *Demonstration of the Existence of a Limit for Regular Sequences of Numbers:* By A. S. Chessin. (University Circulars, J. H. U.)
6. *A New Classification of Infinite Series:* By A. S. Chessin. (University Circulars, J. H. U.)

On motion the meeting adjourned.

Chas. Lane Poor,
Secretary.

Geological Conference of Harvard University, November 12, 1895.

The Pirna and Kirchberg Zones of Contact Metamorphism. By T. A. Jaggar, Jr.

Attention was especially called to the superb maps of the Saxon Geological Survey, the four sections Nos. 124, 125, 135 and 136, making up the Kirchberg area, and sections Nos. 82, 83 and 102 the Pirna series. Each section is accompanied by an 'Erläuterung,' or pamphlet of descriptive text. The scale of the maps is 1: 25,000, and all landmarks which can be of assistance in using these maps in the field are indicated in print, such as 'quarry,' 'brewery,' 'paper factory,' etc. Specimens were exhibited of the various metamorphic series in separate suites, each suite being arranged in a long tray; a colored strip of tape attached to each set of specimens had its duplicate pinned across the map showing locality.

The Kirchberg granite stock lies on the northern flank of the Erzgebirge, south of Leipzig and southwest of Dresden, between the streams Mulde and Göltzsch. Its outcrop forms

a perfect ellipse, about seven miles long in a northeast-southwest direction, and four to five miles in breadth. It is nearly surrounded by hills of 'hornfels' or metamorphosed clay slate, whose elevation above the more easily weathered granitite is well shown by the drainage. To the southeast lies a portion of the Schlema stock of turmaline granite, also bordered by its metamorphic rim of hornfels. The metamorphic belt belongs to the non-fossiliferous Phyllite series and higher, the Cambrian slates. The alteration due to the intrusion of the granitic masses is similar in both formations. The highly crystalline zone next to the granite has an average thickness of 300m., and the outer zone of spotted schist varies from 450m. to 550m. in thickness. These measurements are made perpendicular to the original cooling surface of the granite; the many mining shafts in the vicinity of Schneeberg afford accurate data for such measurement, and show that the alteration zones are determined solely by the position of the granite, quite independently of the dip and strike of the sediments.

The Kirchberg granitite stock consists of a coarse, porphyritic outer shell enclosing a somewhat later intrusion of finer grain; the contact of the two, however, shows that the older magma was still partially fluid when the younger was intruded. At the contact with the hornfels the granitite often interpenetrates the slaty folia in very fine veinlets showing extreme liquidity at the time of intrusion.

At the contact the hornfels contains muscovite, biotite, quartz, andalusite and magnetite; at a distance from the contact it becomes more schistose in character, and greenish-black oblong spots appear, which are chiefly concretions of carbonaceous pigment; going further, the spots disappear, but the slaty folia still retain a crinkled appearance, until finally the unaltered clay slates are reached. The unaltered phyllite and the andalusite hornfels show great similarity in chemical composition, indicating molecular rearrangement rather than actual acquisition of new material.

The Pirna area lies southeast of Dresden, between the great Lausitzer granite stock on the northwest and the gneiss of the Erzgebirge on the southeast. A concise summary of the geology of this contact series is given by R. Beck, Tschermaks Mineralog. und Petrog. Mittheilungen XIII–4–p. 290, 1893.

Southwest from the town of Pirna the altered sediments of Cambrian, Silurian and Devonian age lie in apparently conformable succession, highly inclined and striking northwest. Various granitic masses cut them, producing different metamorphic changes, according to the nature of the rock affected.

The Lausitzer Granite consists chiefly of an oligoclase-quartz-biotite granitite, which in the vicinity of Dohna is replaced by a micaceous granite. A syenite occurs further south in oblong masses parallel to the strike of the sediments, and this varies locally to hornblende-granitite in one case and to quartz-angite-diorite in another. In the southeast part of the area occurs a large granitite stock near Markersbach, characterized by pneumatolytic phenomena and intersected by veinlets which contain cassiterite, topaz, blende, zinnwaldite, turmaline, fluorite, etc. Near it the turmaline-granite of Gottleuba, which shows much kataclastic alteration, occurs in a number of long lenticular masses which lie in general parallel to the strike of the associated sedimentaries. This indicates that dynamo-metamorphism played a part in the changes wrought in this basin, though Beck considers them chiefly contact phenomena, the dynamic action having taken place long after the early igneous intrusions and affecting both granites and stratified rocks alike.

The contact metamorphism observed is as follows:

The Phyllites are altered into spotted schists and andalusite-hornfels as in the Kirchberg area and elsewhere. Chlorite gneiss is altered to biotite gneiss, a somewhat unusual process (see Beck, l. c. and also C. Callaway, Geol. Mag. (3) 10. 535–538. 1893).

Silurian clay slates are altered to 'knoten' schists and nearer the contact to Cordierite-hornfels. Contrary to the rule observed in the phyllites, the 'knoten' in thin section are spots of *less* pigment than the mass of the schist, and in the hand specimen appear as tiny blisters or nodal points. A carbonaceous lydite or siliceous schist becomes graphitic near the granite contact.

Among the various members of the Weesensteiner grauwacke (Devonian) formation is an interesting series of gneissoid rocks between Goppeln and Tronitz. They are feldspathic and full of cordierite, crystals of the latter mineral often attaining great size.

The diabase sheets which generally lie interbedded among the slates and conglomerates are amphibolized, and the diabase tuffs are altered to Actinolite schists.

Further may be mentioned the metamorphic limestones and their associated ore bodies. The chief interest of the region lies in the diversity of the rocks affected by contact metamorphism.

GEOLOGICAL CONFERENCE OF HARVARD UNIVERSITY, NOVEMBER 19, 1895.

Theories of Ocean Currents. By W. M. Davis.

The sufficiency of difference of equatorial and polar temperatures to cause a convectional circulation in the ocean has been strongly disputed by many under Croll's leadership, but warmly upheld by others, notably by Carpenter and Ferrel. The following arguments bear on the discussion:

The cross-equator current of the Atlantic, flowing obliquely from the South Atlantic eddy to the North Atlantic eddy, continually carries a great volume of water from one hemisphere to the other. The only available path for its return is as an undercurrent. Assuming that the surface currents are wind-driven, and that there is no other cause for movement of deep waters than wind-driven surface currents, it follows that the movement of the deep Atlantic water should cross the equator from north to south. But the distribution of bottom temperatures shows very clearly that the bottom movement here is from south to north. Hence the assumption that no cause but surface wind is operative cannot be permitted, and the most available other cause is gravitative convection.

On the other hand, the annual variation of velocity in the surface currents favors their direct control by surface winds rather than their indirect control by convection, as argued by Ferrel. For, if moving as part of a convectional circulation, they should move fastest when the poleward temperature gradient in the ocean water is strongest; and this is in late summer, when the heat equator of the ocean lies poleward of the geographic equator, and the total difference of equatorial and polar temperatures is found in the minimum distance. But if driven by the winds the surface currents should move fastest in winter, for then the poleward temperature gradient in the atmosphere is strongest and then the winds blow fastest. As far as facts are reported, the eastward surface drift of ocean waters in the temperate zones is strongest in the winter season. The critical point in this argument turns on the essential constancy of temperature in the polar oceans, on account of which the variation of the poleward temperature gradient in the water depends only in the position of the oceanic heat equator; while in the atmosphere the polar temperature changes greatly with the season, and hence, in spite of the greater distance from heat equator to pole in the winter hemisphere, the gradient is then strongest on account of the great winter increase in the polar and equatorial temperature contrast. Oceanic convection should be strongest in the summer hemisphere, but atmospheric convection and wind-driven currents in the winter hemisphere. (Fuller publication in the Proceedings, Boston Society of Nat. Hist.)

T. A. Jaggar, Jr.,
Recording Secretary.

NEW BOOKS.

The Structure and Life of Birds. F. W. Headley London, Macmillan & Co. 1895. Pp. xx+412.

Milk, Its Nature and Composition. C. M. Ackman. London, Adam and Charles Black. New York, Macmillan & Co. 1895. Pp. xiv+180. $1.25.

Geological Biology. Henry Shaler Williams. New York, Henry Holt & Co. 1895. Pp. xix+395.

Cambridge Natural History, Vol. V. Peripatus, Adam Sedgwick; Myriapods, F. G. Sinclair; Insects, David Sharp. London and New York, Macmillan & Co. 1895. Pp. xi+584. $4.00.